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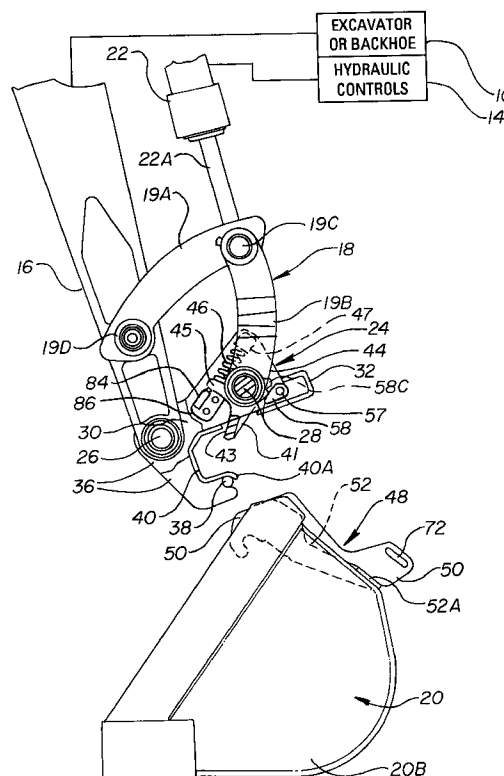
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(54) **Attachment construction for earthworking implement**

(57) A bracket (24) holds a detachable frame (48) attached to a bucket (20) or other tool. The bracket (24) mounts onto the arm (16) of the implement. The bracket (24) carries a latch member (41). The bracket (24) can be moved onto a frame (48) on a bucket (20) or other tool, and is latched in place without dismounting from the backhoe or excavator (10). The latch member (41) can be released, either manually or under power, and then by manipulating the arm (16), the tool (20) and frame (48) can be removed from the bracket (24) and a new tool mounted. The engaging portions of the frame (48) and bracket (24) are such that as wear occurs, the parts will compensate and remain secured without play or slop.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

The present invention relates to interchangeable powered tool attachments such as a bucket, a grapple, hydraulic hammer, tampers, augers and the like used with a power operated arm of an implement such as an excavator or backhoe. The tools use a common frame mounting for coupling to a quick attachment bracket as shown in the present invention. The tools also are made to receive a separate mounting plate for regular pin connection to the arm.

Efforts have been made to provide couplings that can automatically connect tools to an articulated arm of an excavator, backhoe or the like, but most of these require operator action, as well as lacking reliability. Many of the present quick attachment brackets are complicated and time consuming in operation, requiring mechanically removing pins for connection as well as disconnection. One of the prior art couplings is illustrated in U.S. Patent No. 5,110,254. Problems can persist with wear as the unit is used, in that there is no adequate compensation to take care of wear that occurs.

SUMMARY OF THE INVENTION

The present invention relates to a quick attachment bracket assembly for attaching various tools to a excavator, backhoe, or other powered implement that includes a power operated arm or boom. The specific embodiment shown is an excavator arm that has an actuator for pivoting a bucket or grapple around a horizontal axis, and also has actuators for manipulating the arm. In the present invention, a bucket or grapple has mounting walls on which a selected frame for either pin mounting or quick attach mounting can be fixed with no modification to the frames.

In another aspect of the present invention a quick attachment frame is on the tool and the frame couples to a quick attachment bracket mounted to the arm and connected to the operating linkage used for controlling the tool so that the quick attachment bracket can be pivoted about a horizontal axis under power. The quick attachment bracket is made to slide into place on the frame on the tool. As the bracket slides into place on the frame under power operation of the mounting arm, the frame seats into a receptacle on the bracket and the bracket slides into a receptacle that receives a nose piece of the bracket. The frame is secured to the bracket, as shown, by a latch member on the bracket that is spring loaded to latch on a mating portion of the frame. The latch pivots against its spring load to accommodate the movement of the bracket relative to the frame. As the bracket seats in position on the frame, the latch snaps into place under the spring load to securely hold the frame on the bracket.

The primary contact points for carrying loads from the tool (bucket or grapple) automatically adjusts for wear and manufacturing tolerances, so that the frame and tool remains tight fitting on the bracket and will not excessively loosen as wear occurs.

Additionally, the quick attachment bracket carries a pin that protrudes from side plates of the bracket. The frame on the tool has spaced side plates with hooks at the outer ends that straddle the side plates on the attachment bracket so the tool can be supported on the pin to permit ease of maneuverability of the bucket during the coupling and uncoupling operation. This permits the operator to move the tool after the bracket and frame are unlatched or uncoupled. The frame and tool will hang suspended from the bracket when the hooks are engaged with the pin, and the tool, such a bucket, can be placed with one side on the ground for the latching operation.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a schematic side elevational view of a typical excavator arm end portion having a quick attachment bracket made according to the present invention installed thereon and shown adjacent a tool, comprising a bucket, for attachment;

Figure 2 is a perspective view of a bucket showing the bucket mounting frame in position on the back wall thereof;

Figure 3 is a first perspective view of the quick attachment bracket removed from the excavator arm showing the arm mounting side;

Figure 4 is a perspective view of the quick attachment bracket shown in Figure 3 viewed from the side that faces the tool in mounting;

Figure 5 is a side elevation view showing the arm in another stage of attaching the bucket showing a rod on the bracket in position to support a bucket and to position it for attachment through a hook on the bucket frame;

Figure 6 is a view similar to Figure 5 showing the arm and quick attachment bracket mating with a frame on the bucket;

Figure 7 is a view similar to Figure 5 illustrating the quick attachment bracket in a latched position with the bucket frame;

Figure 8 is fragmentary sectional view taken on line 8--8 in Figure 7, with the bucket walls removed for clarity;

Figure 9 is a fragmentary enlarged sectional view of the quick attachment bracket and tool frame shown in latched position;

Figure 10 is a perspective view of the latch used for holding the bucket frame in mounted position;

Figure 11 is an enlarged view with parts removed and broken away showing the quick attachment bracket in a first stage of unlatching from the bucket;

Figure 12 is a view showing the quick attachment bracket being rotated from the bucket, wherein the bucket can be supported on hooks and returned to be supported on the ground;

Figure 13 is a side elevational view of a bucket used with the present invention before a frame is attached, with parts in section and parts broken away;

Figure 14 is a rear view of the bucket of Figure 13;

Figure 15 is a perspective view of a bucket utilizing a common mounting plate but for a pin mounting assembly; and

Figure 16 is side view of a grapple utilizing a frame that can be coupled to the quick attachment bracket of the present invention with parts in section and parts broken away.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A powered implement, such as an excavator or backhoe 10 is shown only as block since such implements are well known. The implement has an arm illustrated fragmentarily at 16. The arm 16 is pivotally mounted to a base arm section and the base arm is pivoted to the implement 10. The arm 16 is controlled and operated from the implement 10 mounting Platform, using hydraulic actuators from a source of hydraulic fluid under pressure, operated through controls, such as valves 14. An end portion of the arm 16 includes a link assembly 18 that is used for controlling a pivoting tool, such as bucket 20. The link is actuated with a double acting hydraulic actuator shown only schematically at 22 and operated through controls 14. The actuator 22 extends and retracts an actuator rod 22A under power and controls a tool, as shown by controlling pivotal movement of a quick attachment mounting bracket 24 that is pivotally mounted on a pin 26 to the outer end of the arm 16. The actuator, acting through linkage 18 will control then pivoting of the bracket about the horizontal axis of the pin 26.

The link assembly 18 as shown, has a pair of links 19A and 19B that are pivotally mounted together with a pin 19C. The pin 19C also is the attachment pin for the actuator rod, 22A. The links 19A and 19B are suitably bifurcated to have multiple attachments on the single pin. The link 19A is pivotally mounted to the boom or arm 16 at the pin 19D and the outer end of link 19B is pivotally mounted to quick attachment bracket 24 with a pin 28.

The quick attachment bracket 24 is shown in Figures 3 and 4 individually and also in figure 1 when installed on arm 16. The quick attachment bracket 24 has a pair of side plates 30, 30 that form a support for a nose piece wrapper 32 that extends across the space between the side plates 30 and is welded to the side plates 30 to form an assembly. The side plates 30 are formed to have lower support ears 36 that are recessed

to support a channel shaped saddle or retainer channel 40 that also extends across the space between the side plates 30 and is welded thereto to secure the opposite end of the quick attachment bracket 24. The side plates 30 receive the main mounting pin 26 through bores 26A and the pin 26 extends across the space between the side plates 30. The linkage pin 28 also extends through bores 28A and extends across the space between the side plates 30.

A pin 38 is supported on the outer ends of the ears 36 and is held in place partially under a lead-in lip 40A on one outer edge of the channel shaped saddle 40. The pin 38 extends outwardly beyond the side plates 30 to provided support ends 38A, which are used to support the tool or bucket 20 during mounting and releasing the bucket 20 from the quick attachment bracket 24.

The pivot pin 28 also mounts a frame latch 41 shown in perspective view in Figure 10 detached from the bracket 24, and also shown in Figures 1, 6, 9 and others. The latch 41 is a yoke shaped member that has a pair of latch arms 42 held together with a latch bar 43 at their outer ends. The arms 42 have hubs 44, 44 that also are shown in Figure 10. The hubs 44 have bores that pivotally mount over the shaft 28 and grease fitting bores are shown in Figure 10 for lubrication for ease of pivoting. The hubs 44 have control arms 45, extending therefrom and the arms 45 are spring loaded with strong compression springs 46 that are retained in spring supports 47 that are fixed to the side plates 30 and bear against the arms 45. Roll pins 45A are provided on the control arms 45 to retain the springs 46 in place. The end 43A of the latch 41 is rounded with a large radius for smooth engagement when latching.

The latch 41 is thus urged by the springs 46 to rotate in counterclockwise direction as shown in Figure 1, and are retained from rotating too far by suitable stops that will be explained.

The bucket 20 has a quick attachment frame 48 attached thereto. The quick attachment frame 48 is shown in Figure 2 in perspective view and in enlarged cross sectional view in Figures 9 and 11. The frame 48 is made up of side plates 50, 50 that are welded to a latch backing plate 52. The side plates 50 have hook ends 54 with receptacles 56 formed in them (see Figures 5 and 6).

The side plates 50 of the frame 48 are spaced wider than the side plates 30 and wider than the nose piece 32 and the saddle 40 and will fit over the outside of the quick attachment bracket 24 when the bracket seats in the frame 48. The frame 48 also seats between the side plates 20B of the bucket 20. The frame 48 is welded to a back wall 21 of the bucket 20, which is formed separately and becomes an integral part of the frame 48, as will be explained.

The latch 41 is held in its "ready" position shown in Figure 1 when the bracket is ready to be used in any selected way, and as shown a pivoting pawl 58 is mounted on a shaft 57, on at least one side of the latch

aligns with a hub of the latch and as shown in Figure 6, it is positioned to engage a stop lug 59 integral with a hub 44 aligning with the pawl 58. The stop lug has a stop surface 59A for holding the latch retracted for a release position and has a second surface 59B which is used to hold the latch in the ready position as shown in Figure 1. The pawl is spring loaded with a torsion spring 58A to rotate in clockwise direction as shown in Figure 6. The torsion spring 58A is shown only schematically. Thus the end of the latch protrudes into the area overlying the channel 40 when it is in its ready position.

The plate 52 of the frame 48 is formed to provide support for the quick attachment bracket 24 and as perhaps best understood from the showing in Figure 6, includes a planar flange portion 52A at one end, near the bottom of the bucket 20 when the bucket is working. In the mid portions of the plate 52 the plate bends inwardly through an opening 21C in the rear wall 21 of the bucket 20, and then an inclined latch wall section 52B is formed to extend back outwardly. The plate has a section 52F that is coplanar with flange 52A and the end of the plate 52 then has a flange 52C formed at right angles to the plane of the planar flange 52A and the wall section 52F, which plane is illustrated at 52D in Figures 5 and 6. The flange 52C is seated in a receptacle formed in the ears 54 of the side plates 50 of the frame 48.

The wall 21 of the bucket 20 at the rear of the open side is formed with an inverted channel edge portion 21D, as perhaps can be seen by referring to Figures 13 and 14 as well as Figures 9 and 11. The wall 21 is edge portion 21D near the open end of the bucket 20 formed with a base wall 21A and a flange 21B is formed back toward the opposite end of the wall 21. An opening 21C is formed in the wall 21 to receive the formed plate 52 of the frame 48, and edge portions of the side plates 50 that extend out from the plate 52 to provide a welding surface. A liner wall 62 is used on the interior side of the wall 21 and tapers away from wall 21 in direction toward the open end of the bucket. The wall 62 has a flange 62A that is welded back to the wall 21 to enclose the opening 21C. The wall 62 is also welded to the side walls of the bucket when the walls 21 and 62 are installed on a bucket. The wall edge portion 21D is carefully formed since it is used in the mount of the frame on the bracket 24. The bend where the flange 62A joins the main portion of the liner wall 62 is welded to the edge of flange 21B of the wall 21, so the plane of the face 65 of the flange 21B relative to the plane of the wall 21, and the plane of the plate 52 can be closely controlled. The assembly of the wall 21 and walls 62 is used for a number of tools so the frame 48 is easily mounted.

As may be seen in Figure 9, when the frame 48 is welded to the back wall 21A, the flange 52C is mounted against the wall 21A and the wall 52 is placed so flange 52A and the wall section 52F are also tightly against the wall 21. The distance from the plane 52D and the plane of surface 65 is closely controlled.

The first step for mounting the tool, as shown the bucket 20, is shown in Figure 1. The bucket is considered as having been set on the ground in the position shown, with the frame 48 at the top. The excavator arm 16 is moved so that the quick attachment bracket 24 is adjacent the bucket 20. The bracket 24 is tilted so that the channel 40 is facing generally toward the frame 48, with the rod 38 above the ears 54 of the frame.

In Figure 5 in the sequence of attaching the frame 48 and the bucket 20 to the quick attachment bracket 24, it can be seen that the arm 16 has been moved to a position where the pin 38 rests in the receptacles 56 of the frame 48 on the bucket 20. Again, the hooks 54 on the side plates 50 of the frame fit to the outside of the quick attachment bracket side plates 30.

The arm 16 can now be lifted and the bucket 20 will hang from the quick attachment bracket 24, so it can be moved or positioned where desired for finishing the attachment coupling. The suspension of the bucket on rod 38 through hook end 54 and receptacles 56 position the bucket and frame 48 properly for automatic attachment. This also illustrates that when uncoupling the bucket, the bracket 24 can be released from the frame 48 and the bucket will not fall to the ground, but rather will be supported on the rod 38 and the hooks 54, which have receptacles 56 for the rod 38.

The rod 22A of the hydraulic cylinder or actuator 22 is extended so that the linkage 18 tilts the quick attachment bracket 24 to a position where the plate portion 32A of the wrapper nose 32 rests on the flange 52A of plate 52 of the frame 48, as shown in Figure 6. The open end of the channel 40 is aligned with the flange 52C and the end of the wall of the 21, including the end wall 21A and the flange 21B, which are removed from Figure 6 for clarity.

As the bracket 24 is moved to the position shown in Figure 6 the latch 41, which was protruding from the frame and held there by pawl 58 is forced to the position shown in Figure 6, to ride on plate portion 52F against the action of springs 46, which urge the latch in counterclockwise direction. The bucket has to resist the force of the springs 46 as the bracket is slid to the position of Figure 6. The pawl 58 is spring loaded in clockwise direction, as seen Figure 6, with a torsion spring 58A that has a leg that fits under the pawl end and when the latch is moved by the frame plate 52 as the bracket is slid into place the pawl moves away from the stop surface 59B and will rest against the lug 59 on the latch.

The next step in attaching or mounting the bucket on the quick attachment bracket 24 is to move the bracket in direction indicated by the arrow 70 in Figure 5, to slide the bracket so the nose piece 32 slides under a retaining bar 72 that is mounted on and extends between the side plates 50 of the frame 48. The retaining bar 72 holds the nose piece 32 against the flange 52A of the plate 52, and the latch 41 moves so the latch end 43A, which is rounded with a large radius, engages the surface of inclined latch section 52B to prevent the

bracket 24 from reversing relative movement with respect to the frame 48 and uncoupling. The frame 48 and attached tool, as shown, the bucket 20, are ready for use.

Figure 8 is a sectional view take on an irregular sight line to illustrate the frame 48 and latch 41 in latched position with parts removed for clarity. The bucket sides are not shown, but an end view of the flange 21B against the outer leg 40B of the channel shaped saddle 40 is shown.

Figure 9 is an enlarged sectional view of the bracket 24 and frame 48 in fully engaged or mounted position. The main panel 32A of nose piece 32 is held against frame flange 52A and is held from moving away from the frame 48 and frame plate 52. The nose piece 32 is free to slide away from the retainer bar 72 but is retained in position by the latch 41 acting against the tapered wall section 52B of the frame plate 52.

The channel shaped saddle 40 is made so that it will accommodate wear in combination with the frame and the edge portion 21D of wall 21 formed by walls 21A and 21B. The channel shaped saddle 40 includes a first leg 40B that supports the lip 40A, and this wall 40B is parallel to the plane 52D of the plate 52. It is also parallel to the wall or flange 21B of the bucket back wall top edge portion 21D.

The channel shaped saddle 40 has a base 40C that is parallel to and spaced slightly from the flange 52C of the plate 52. The saddle further has an inclined formed corner wall section 40D that extends at an angle to the base 40C and which joins the side wall 40E. The inner surface 40F of the inclined corner wall section 40D acts as a cam surface against the corner of the frame plate formed between plate wall section 52F and the plate flange 52C. The cam surface 40F and the corner engage at a tangent point indicated at 76 in Figure 9. The forces from the latch 41 and the seating forces developed when the bracket 24 is pushed into latched position in turn cause the cam surface 40F to force the wall 21B against the inner surface of the saddle wall 40B, along line 78 (Figure 9) to eliminate play or movement when held with the latch 41. The tightening action will continue as the corner wears because of the cam surface 40F, so the latch bracket 24 and frame 48 will not loosen excessively. Also, the cam action insures tight seating of the parts even with manufacturing variations.

Figure 11 shows a first stage in the unlatching of the frame 48 and bracket 24. The latch 41 is moved to a position to clear the surface of plate section 52B. The latch 41 is rotated against the force of springs 46 either by mechanically prying the latch clockwise with a pry bar used in a receptacle 80 (see Figure 10) acting through a slot 81 in the bracket side plate 30 (see Figure 4) or by operating small hydraulic cylinders 84 having rods 85 that are mounted on brackets 86 bolted or otherwise fixed to the sidewalls 30 of the quick attachment bracket 24. The rods 85 of the cylinders are positioned

to act on the respective lugs 45, and are single acting cylinders that are operated with a valve 83 (see Figure 11). When the pistons 85 are extended, as shown in Figure 11, the latch 41 is pivoted clockwise to a position where the latch end clears the surface of plate section 52B and the pawl 58 will snap under its torsion spring load to engage the stop surface 59A to hold the latch in its disengaged position.

The arm 16 can then be actuated to back the bracket out from under the bar 72 so the frame and bucket can roll out of the bracket. The hooks 54 are positioned so that if the removal action is done with the bucket off the ground, the bucket will not fall free, but the hooks 54 and receptacles 56 will catch the ends 38A of rod 38 to hold the bucket, as shown in Figure 12. The excavator can then be operated to deliver the bucket to a storage location and when the bucket is supported on the ground or other support, it can be released by manipulating the arm 16 or the bracket 24 by operating the actuator 22.

The reset of the pawl 58 to hold the latch 41 in its ready position for reattaching the frame 48 is automatically done when the bracket is rotated to the position shown in Figure 12. One of the sides of the link 19B has an actuator button 58C that is a protrusion which strikes the pawl 58 when the bracket 24 is rolled to its position shown in Figure 12 as the bracket is removed from the frame 48. When the pawl 58 is slid off the surface 59A, the springs 46 kick the latch counterclockwise and the pawl spring 58A keeps the pawl against the stop lug 59 so the pawl end engages the surface 59B and holds the latch in position shown in Figure 1. The protrusion or button 58C on the link 19B can be seen in Figures 1 and 9 as well. The hydraulic cylinder 84 can act as a stop for the latch 41 to hold it in its ready position, if a hydraulic release cylinder is used on the bracket 24.

The bucket construction shown in Figures 13 and 14 for the frame 48 for the quick attachment bracket also is usable when a pinned bucket is desired. The pinned bucket is one where it is pivoted directly to the end of arm 16 and also directly to the end of link 19B.

As shown in Figure 15, a pinned bracket 88 comprises a flat plate 90 that fits against the outer surface of wall 21, and which covers the opening 21C and is welded in place. The plate has a bent over end that fits around the end wall 21B for positioning. The plate carries pin brackets 92 that have bores for receiving pins to directly mount the bucket to the arm 16 and link 19B.

Figure 16 shows a grapple 100 that has three spaced grapple teeth 102 (two are shown where the closest one is broken away). The teeth 102 are mounted on the same wall assembly as used with the bucket, including on wall 21 that has an end wall 21A and a flange 21B for mounting the plate 52 and bracket 48. The wall 21 includes the opening 21C to receive the formed plate 52. The wall 62 and flange 62A are also used.

The frame 48 can be welded in place on the grapple

and then attached to the bracket 24, as shown in the previous figures.

Grapples are used with "thumbs" or other reaction members against which the grapple will clamp loads, and the quick attachment bracket and frame permits changing the grapple to a different style without unpinning the thumb or reaction member. This greatly simplifies changing the grapples.

It should be noted that the frame 48 is used on buckets of all sizes, and wider buckets are accommodated easily, without altering the frame.

Fast reliable operation for interchanging buckets or other tool is achieved. The ability to remove the bucket with the bucket off the ground without having the bucket fall freely is helpful, and is achieved by use of the overlapping ears and receptacles on the frame 48, in combination with the rod 38.

Any wear between the plate 52 and the channel saddle 34 will occur on the corner of the plate 52. The line of contact between the end of latch 41 and the tapered surface of the plate 52 will move up the surface on wall portion 52B and continue to latch the unit tightly in place. The latch 41 is spring loaded in counter clockwise direction. Normal manufacturing tolerances are also accommodated.

The plate 21 and liner plate 62 can also be applied to tools for mounting the frame 48 on the tool for use with quick attachment bracket. Power augers and concrete breakers can thus be attached and removed easily.

Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the invention.

Claims

1. What is claimed is:

a tool for an arm operated under power constructed for conversion between a pin mounting frame and a quick attachable frame comprising a tool, a base wall secured to the tool, a rear wall comprising a panel having an opening therein, and a plate separate from the rear wall covering the opening, said plate being either a quick attachment frame plate, or a pin plate, and the plate being secured in place to the base wall to cover the opening.

2. The tool of claim 1, wherein said quick attachment frame plate is non-planar, and has a portion forming a latch surface protruding through the opening of the base wall when the quick attachment frame plate is in place on the wall.

3. The tool of claim 1 or 2, **wherein said pin plate is**

a planar plate overlying the opening, said planar plate having hub members thereon for permitting pin mounting to an earthworking implement.

4. The tool of any of claims 1 to 3, **wherein said base wall** comprises a pair of panels, a first of the panels having the opening and being to an exterior of the tool, a second inner panel positioned to an interior side of the first panel, said inner panel and said first panel joining adjacent one edge and tapering apart toward an opposite edge of the base wall such that the second panel is spaced from the first panel in the regions of the opening in the first panel, and an edge portion formed on the first panel and having a flange extending toward the one edge and joining said second panel to support the panels in spaced-apart relation adjacent a side of the bucket.

5. A quick attachment bracket for an implement arm for attachment to a frame member secured to a tool, said frame having a wall member having a formed edge, said bracket including a pair of bracket side plates, and a cross member joining said bracket side plates and holding the side plates in spaced-apart relationship, said cross member forming a receptacle for receiving the formed edge of the frame

6. The quick attachment bracket of claim 5, wherein said formed edge comprising a channel with a pair of substantially parallel walls, a first of said parallel walls being substantially contiguous to a portion of the cross member when the formed edge is in the receptacle, a second of said parallel walls of said channel being spaced a known distance from and being parallel to the main portion of the cross member.

7. The quick attachment bracket of claim 6 wherein said receptacle of the quick attachment bracket comprises a saddle for receiving said channel having a rounded corner at an end of the first parallel wall, said saddle having a wall section that tapers from the main portion of the cross member toward a base of the saddle, the saddle having an opposite wall spaced from the main portion of the cross member such that the corner of the channel engages said tapered wall section of the saddle and forces tending to move the saddle toward the channel urging the second parallel wall of the channel against the opposite wall of the saddle.

8. The bracket of claim 7, wherein said bracket has a latch member for engaging a latch portion of the frame, said latch member urging said bracket and frame to seat the channel into the saddle, and said latch member preventing opposite separating movement of said channel relative to the saddle

until the latch member is selectively released.

9. A quick attachment bracket and frame assembly for use with an implement having a power actuated attachment assembly mounted on an implement arm, comprising a frame attachable to a tool, said frame including a plate portion having planar portions and having a pair of side plates supporting the plate portion, the frame having a retainer at one end and a rim flange at an opposite end, the frame being used in combination with a quick attachment bracket pivotally mountable on an earthworking implement arm, said bracket including an end portion engaging the retainer on the frame and a support for receiving the rim flange of the frame, and a member for retaining the frame on the bracket to prevent the frame from moving in a direction away from the support when the rim flange of the frame is seated on the support.
10. The assembly of claim 9, wherein the plate portion has an inclined surface that inclines away from the bracket, and said bracket having a pivoted latch that is spring loaded to engage the inclined surface when the rim flange of the frame is seated on the support, said latch being spring loaded to pivot in a direction toward the inclined surface, said bracket being slidable in a direction along the plane of the frame to cause the rim flange of the frame to fit in the support, and said end portion of the bracket comprising a nose that slides into the retainer on the frame for retaining the nose from movement away from the frame.
11. The assembly of claim 10 and a hydraulic actuator mounted on said bracket to urge the latch to pivot in a direction away from the inclined surface against the spring load on the latch.
12. The assembly of any one of claims 9, 10 or 11, wherein said frame is attached to a tool having a wall with an edge portion, with the rim flange of said frame resting on the edge portion and having a main part of said plate portion perpendicular to said flange engaging the wall of the tool, the edge portion of the tool extending beyond said rim flange and having a wall substantially parallel to the main part of the plate portion adjacent the flange, the support comprising a generally channel shaped saddle for receiving the rim flange of the frame and the edge portion of the wall of the tool on which the frame is mounted.
13. The assembly of any one of claims 9, 10 or 11, wherein said support comprises a saddle having a pair of spaced apart walls coupled to a base wall, a first of said spaced apart walls being coupled to the base wall by an inclined wall portion that extends

obliquely relative to the plate portion of the frame, said inclined wall portion engaging a corner formed between the rim flange and an adjacent main portion of the plate portion, whereby as the saddle moves toward the rim flange, the rim flange and the edge portion of the wall of the tool are urged toward a second of the spaced apart walls of the saddle, the inclined wall portion of the saddle acting as a cam to keep the wall of the rim portion against the second wall of the saddle.

14. The assembly of claim 9 wherein said side plates extend beyond the rim flange and have hook receptacles formed therein for receiving a support rod on the bracket as the rim flange disengages from the support and the nose portion is released from the retainer.

FIG. 1

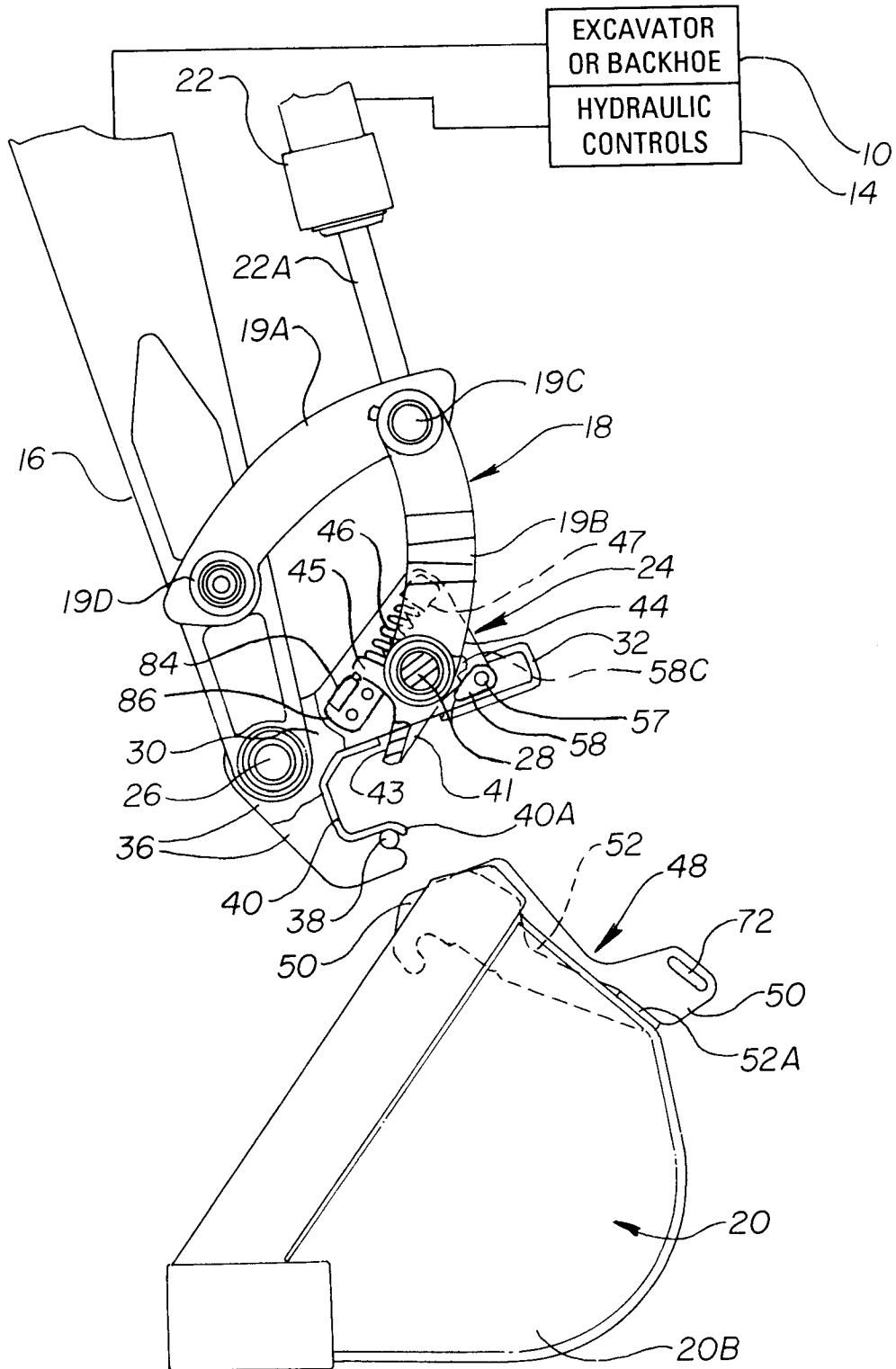


FIG. 2

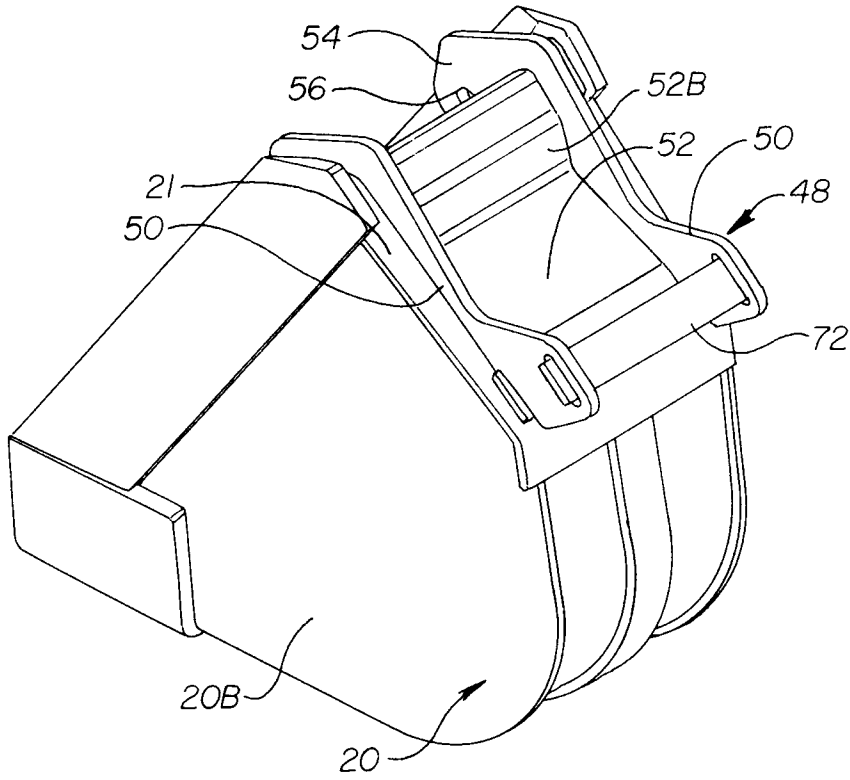


FIG. 3

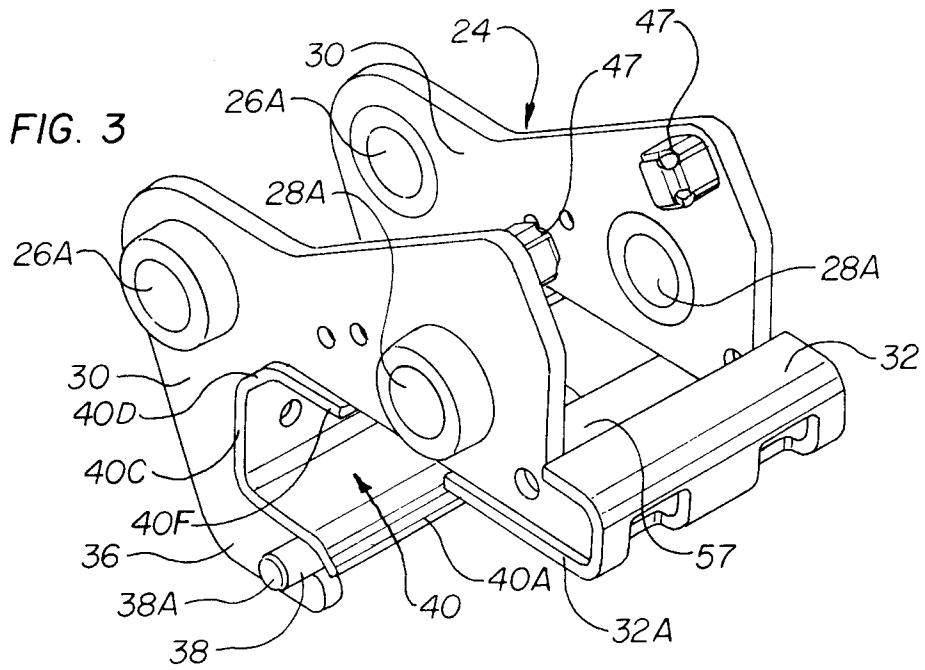


FIG. 4

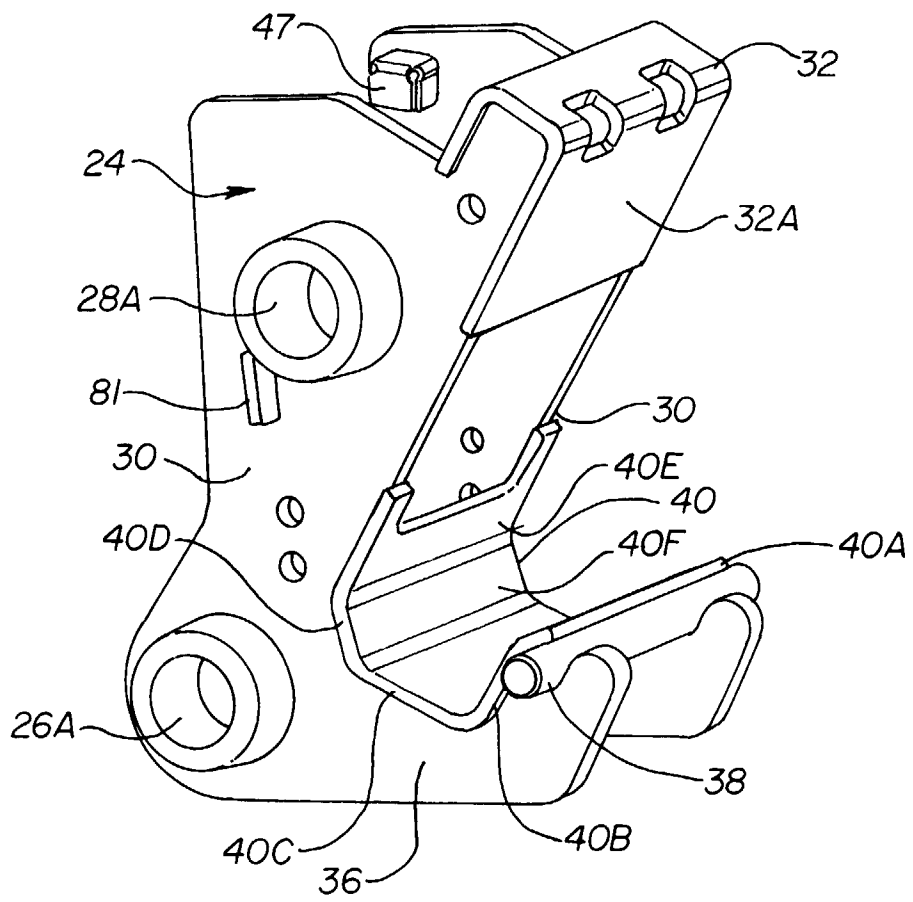


FIG. 5

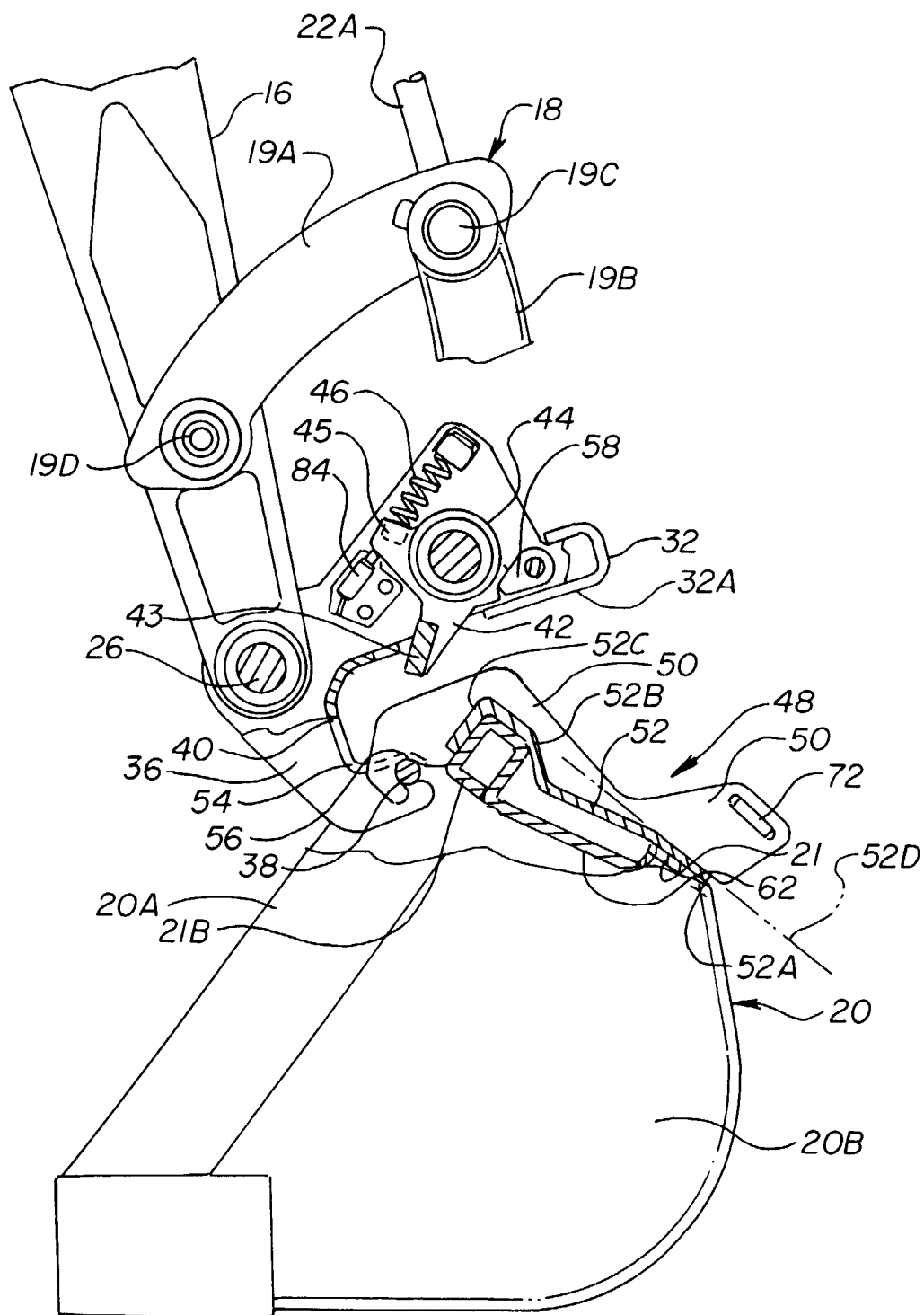


FIG. 6

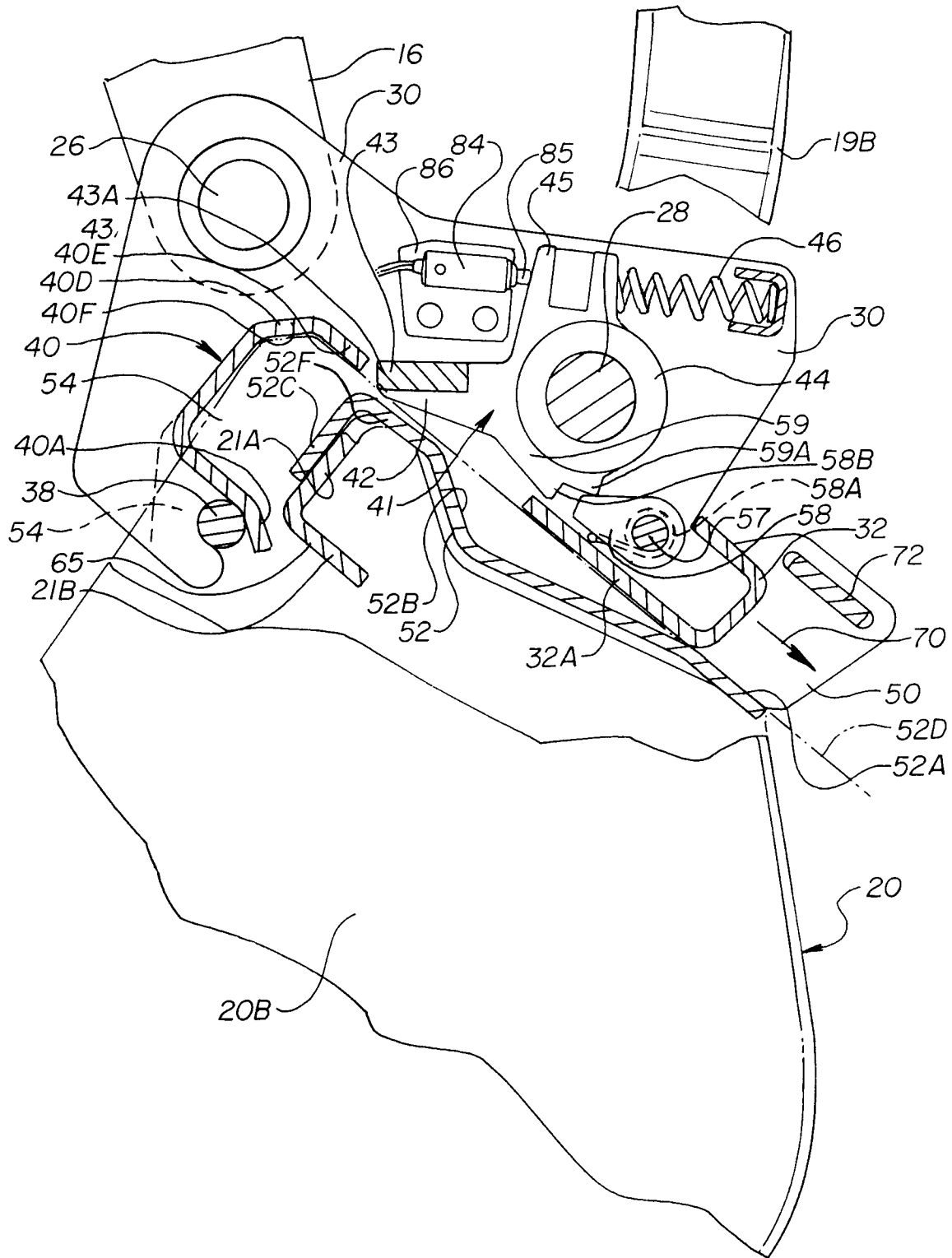


FIG. 7

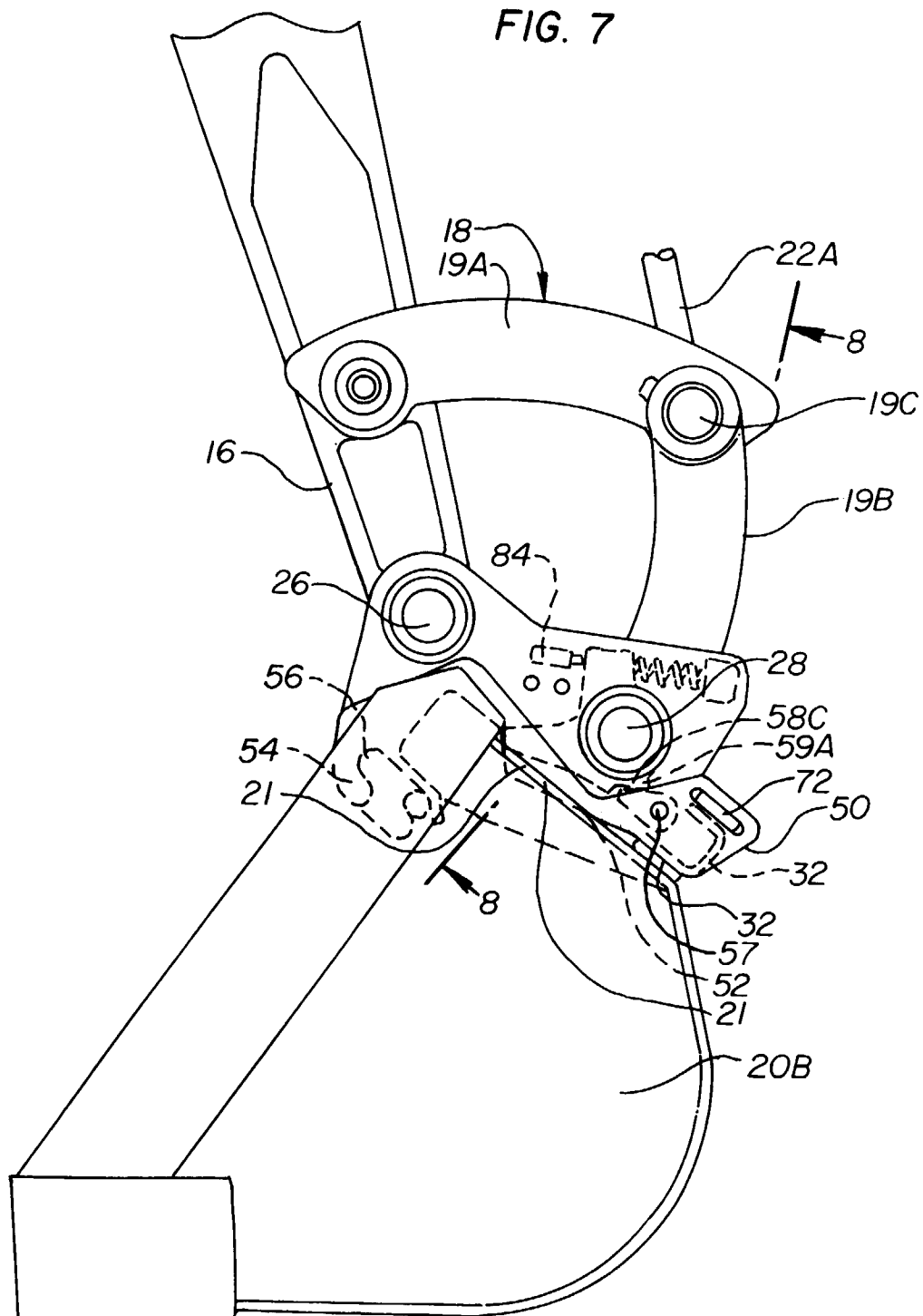
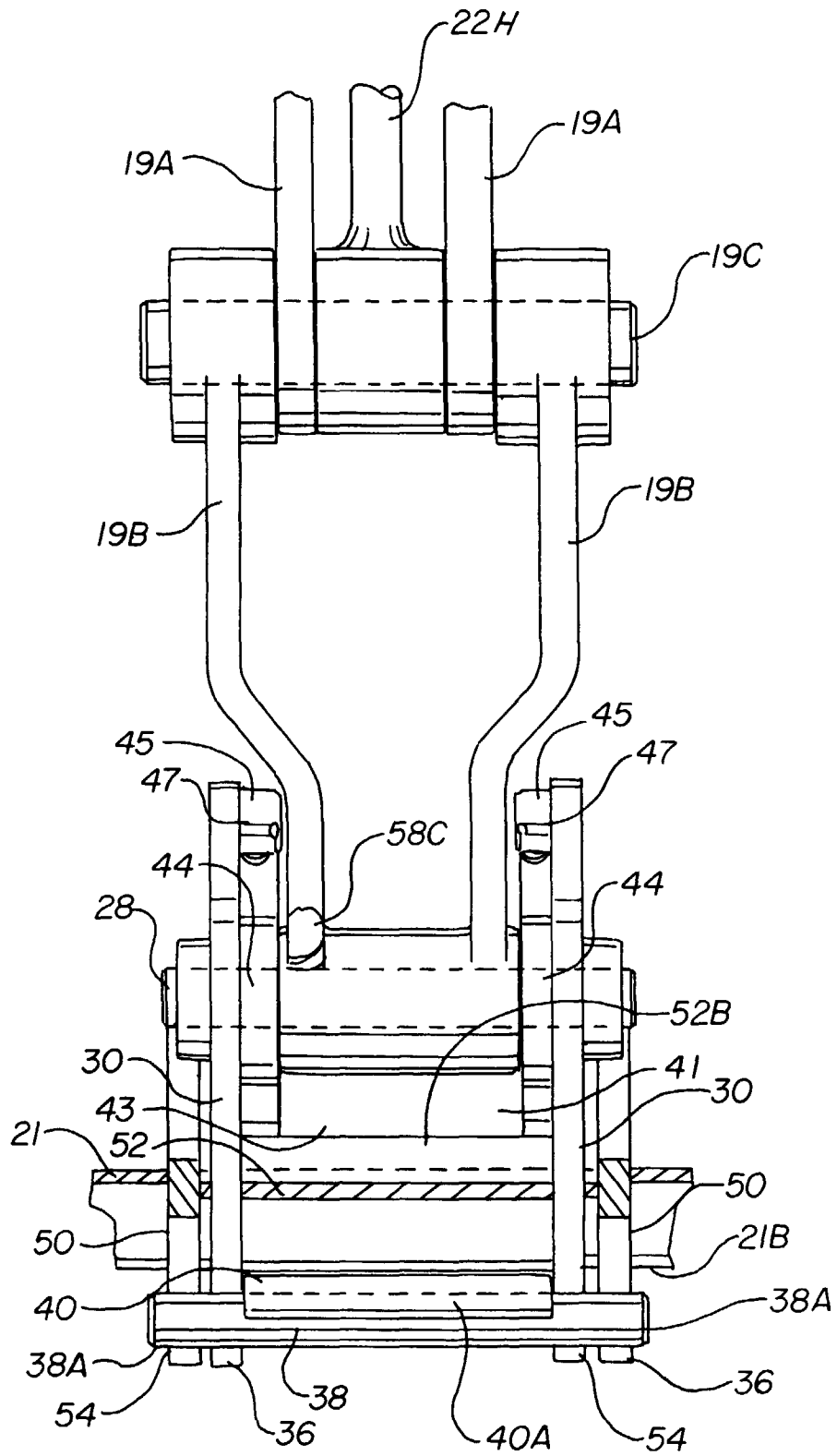


FIG. 8



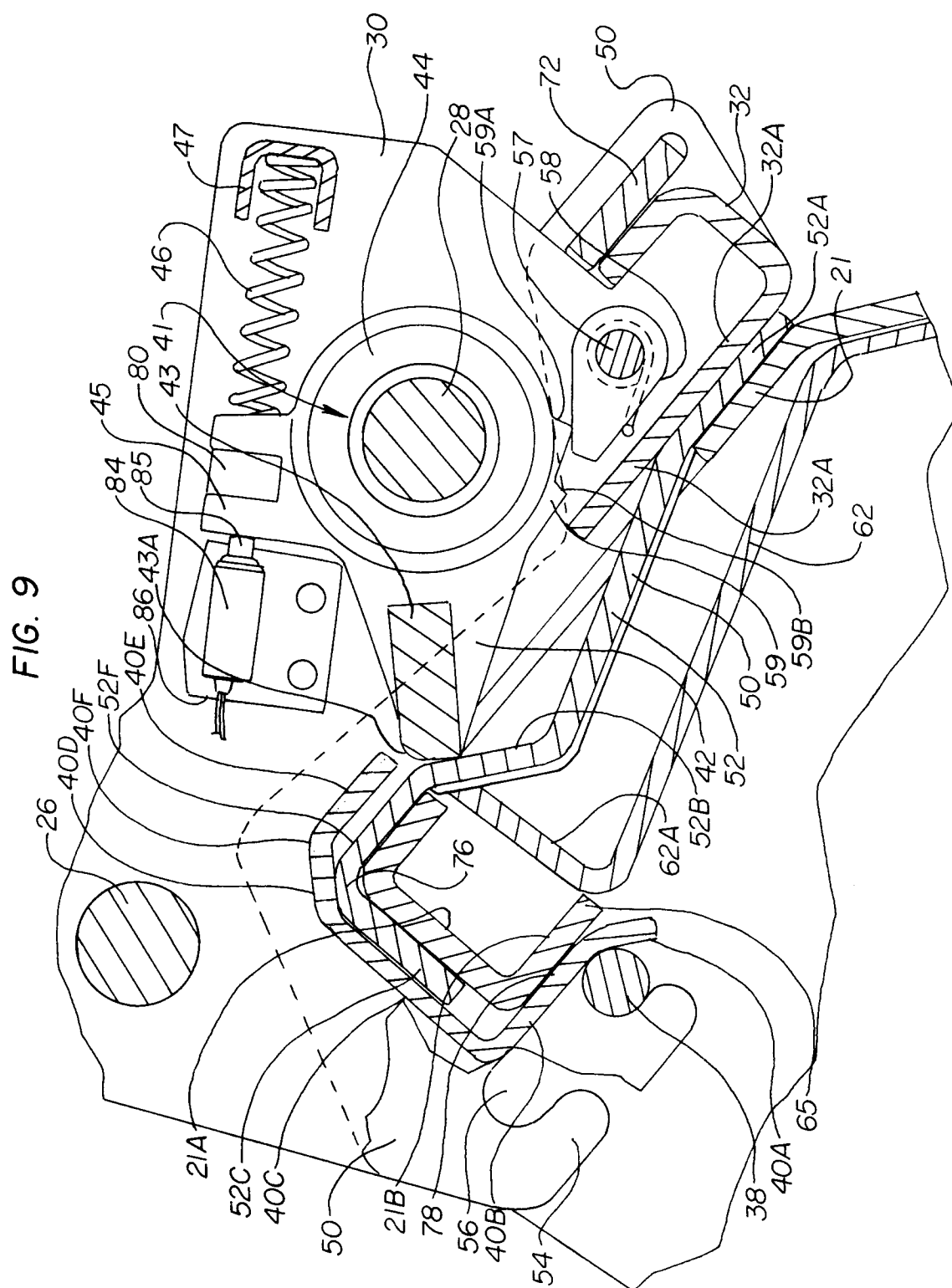


FIG. 10

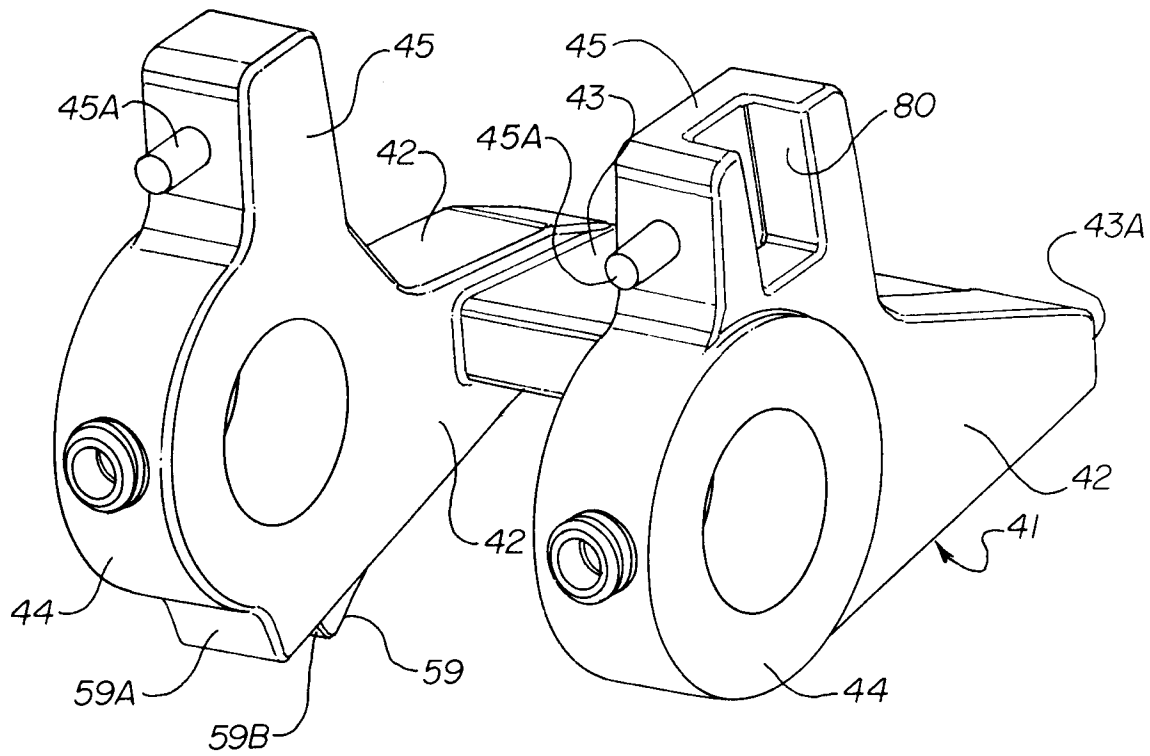


FIG. 11

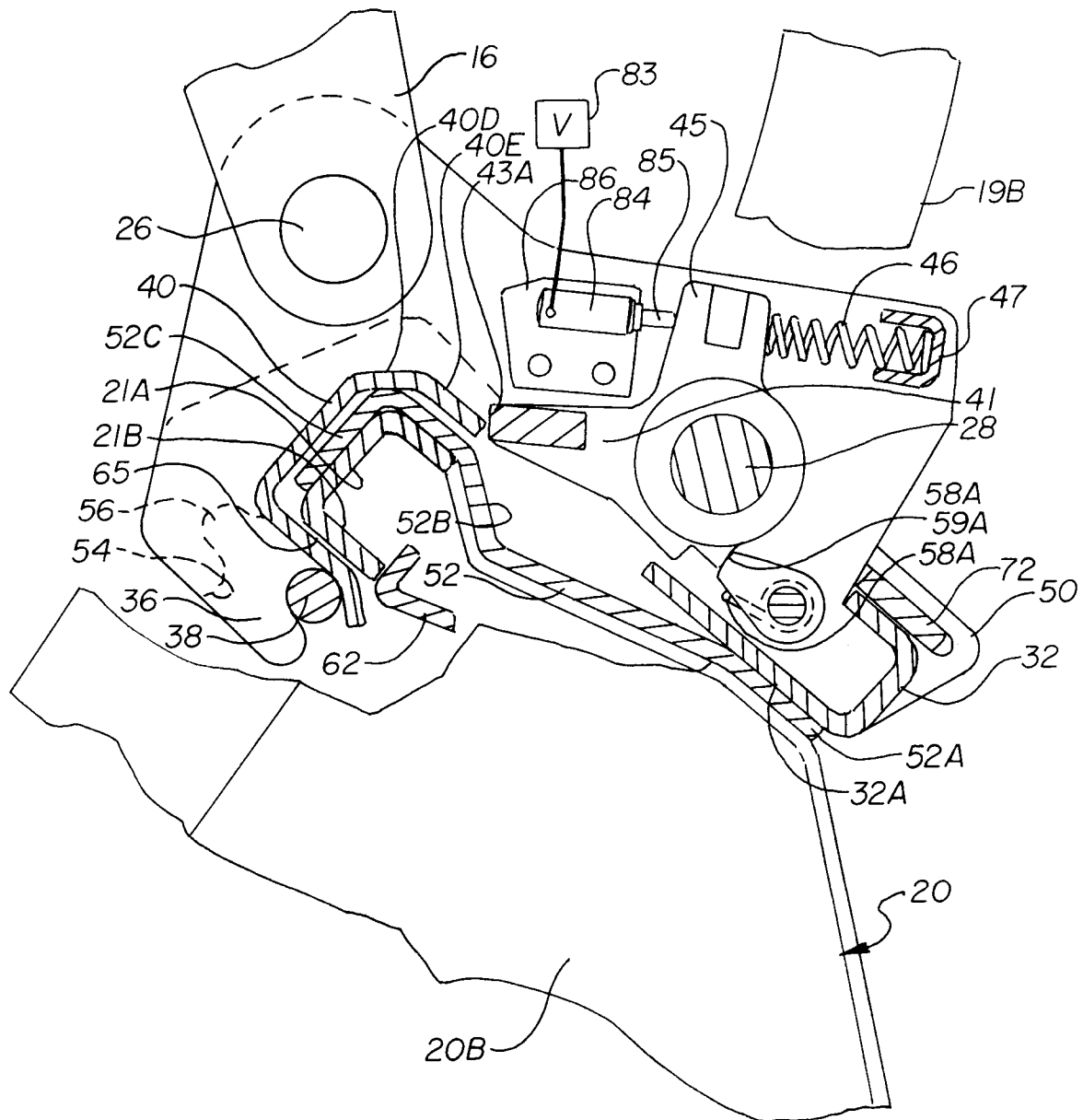


FIG. 12

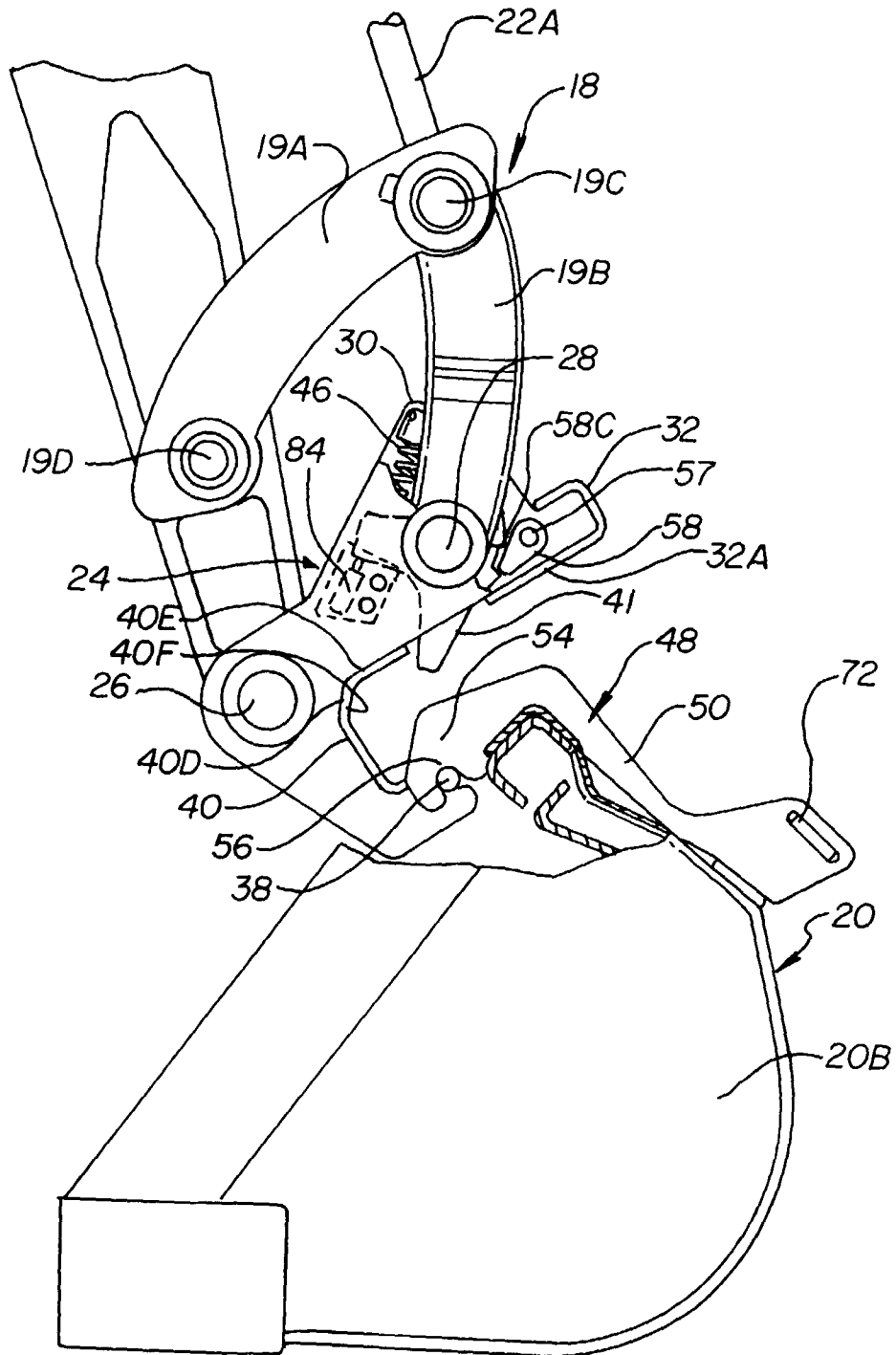


FIG. 13

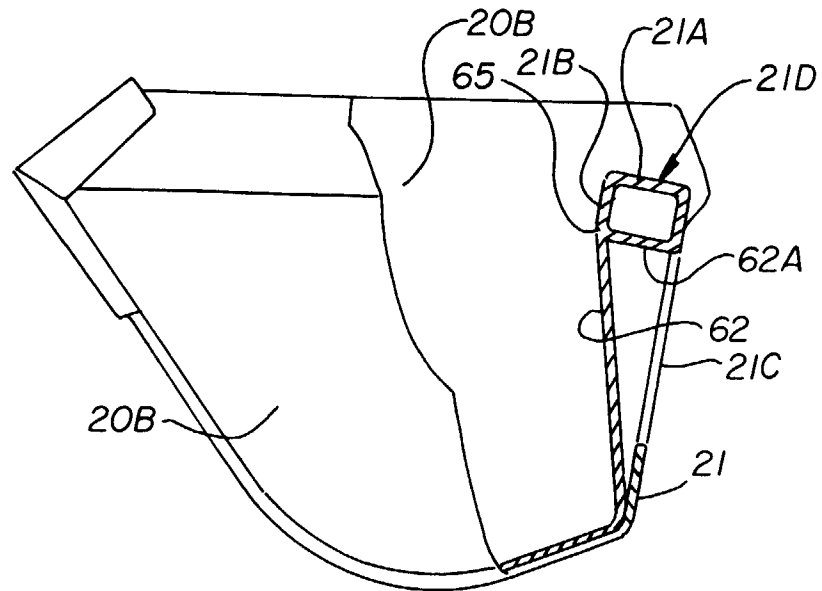
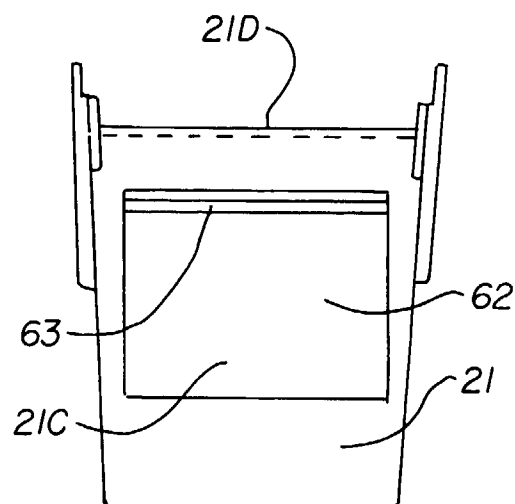
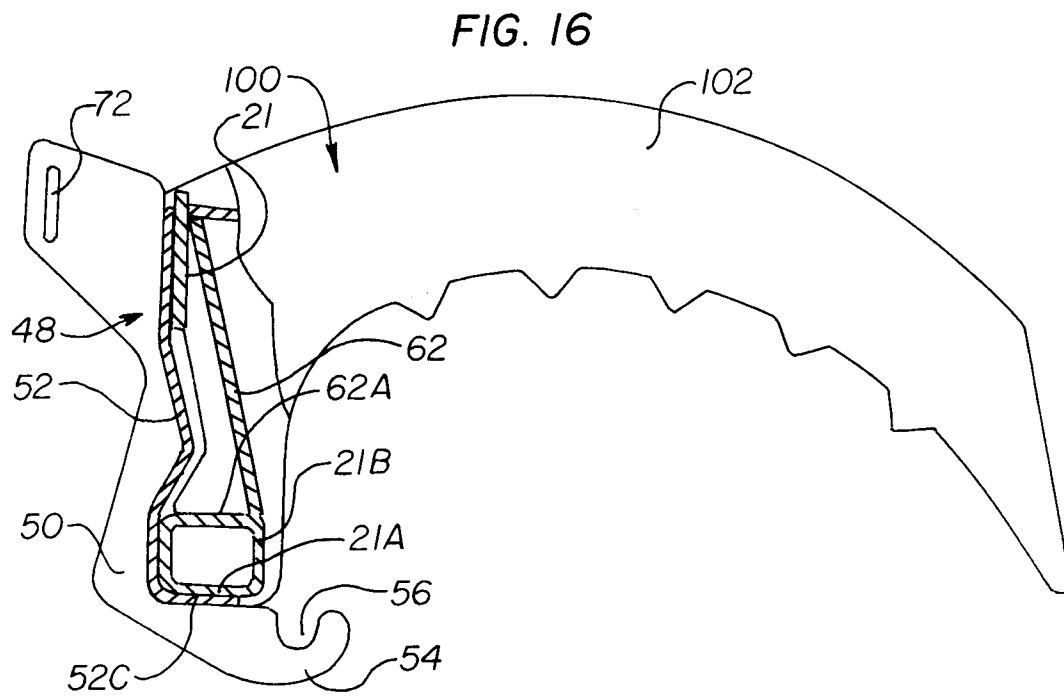
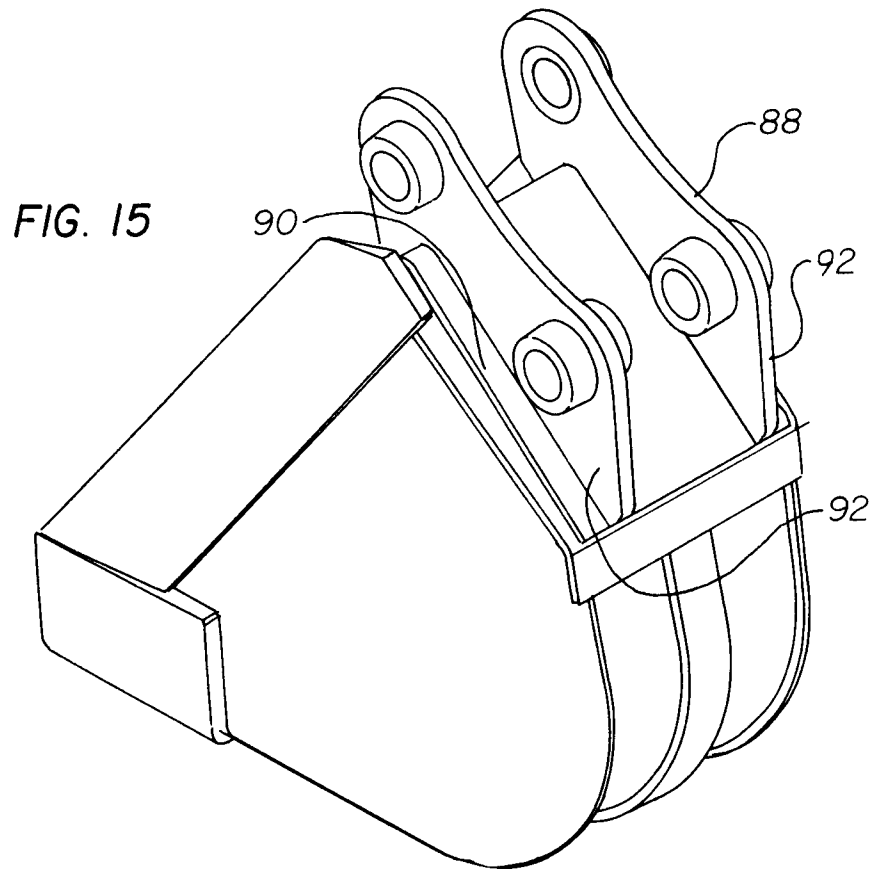


FIG. 14







European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 98 10 3956

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 5 098 252 A (SHEESLEY DONALD L ET AL) 24 March 1992 * figures 3A,7,8,9 * * column 4, line 7 - column 5, line 40 * ---	1	E02F3/36 E02F3/40
A	EP 0 672 796 A (GROUPE PEL JOB) 20 September 1995 * column 4, line 2 - column 6, line 2 * * column 8, line 4 - line 8 * * figures * ---	1,4,5,9	
A	EP 0 321 902 A (ZEPF HANS RUDOLF) 28 June 1989 * column 4, line 3 - line 10 * * figures 2-4,6 * ---	4	
A	GB 2 040 262 A (BEALES STEEL PROD) 28 August 1980 * figures 1,2 * * page 4, line 37 - line 56 * ---	4	
A	GB 2 068 332 A (P. J. DE PINGON) 12 August 1981 * the whole document * ---	5,9	TECHNICAL FIELDS SEARCHED (Int.Cl.6) E02F
A	EP 0 637 649 A (GROUPE PEL JOB) 8 February 1995 * Manière de réaliser l'invention * * figures * -----	5,9	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 4 June 1998	Examiner Guthmuller, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document			

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